

WHAT IS CLAIMED IS:

1. A method of interrogating an addressable array unit having a transparent substrate with a back surface, and an array with a plurality of different chemical features on a front surface, the method comprising:
 - (a) illuminating the features while the array is dry, with an interrogating light which is directed through the substrate from the back surface and onto the chemical features on the front surface; and
 - (b) detecting light emitted from respective features in response to the interrogating light, which detected light has passed from the front surface, through the substrate and out the back surface;
wherein the light is emitted from locations of the features which are spaced from the front surface a distance of less than one-eighth of the wavelength of the illuminating light in a gas or a vacuum which is in contact with the dry array.
2. A method according to claim 1 wherein the light emitting locations of the chemical features are spaced from the front surface a distance of less than one-tenth of the wavelength of the illuminating light.
3. A method according to claim 1 wherein the light emitting locations of the chemical features are spaced from the front surface a distance of less than one-twentieth of the wavelength of the illuminating light.
4. A method according to claim 1 wherein the light emitting locations of the chemical features are spaced from the front surface a distance of less than one-fiftieth of the wavelength of the illuminating light.
5. A method according to claim 1 wherein the interrogating light is directed toward the back surface at an angle of between 0 and 45 degrees to a normal to the back surface.
6. A method according to claim 5 wherein the angle is less than 25 degrees.

7. A method according to claim 5 wherein the angle is less than 10 degrees.
8. A method according to claim 1 wherein the chemical features are polynucleotides.
9. A method according to claim 1 wherein the chemical features are amino acid polymers.

10. A method of interrogating an addressable array unit having a transparent substrate with a back surface, and an array with a plurality of different chemical features on a front surface, the method comprising::

- (a) illuminating the features while the array is dry, with an interrogating light which is directed through the substrate from the back surface and onto the chemical features on the front surface; and
- (b) detecting light emitted from respective features in response to the interrogating light, which detected light has passed from the front surface, through the substrate and out the back surface;

wherein the light is emitted from locations of the features which are spaced from the front surface a distance of less than one-eighth of the wavelength of the emitted light in a gas or a vacuum which is in contact with the dry array.

11. A method according to claim 10 wherein the light is emitted from locations of the features which are spaced from the front surface a distance of less than one-tenth of the emitted light wavelength.

12. A method according to claim 10 wherein the light is emitted from locations of the features which are spaced from the front surface a distance of less than one-fiftieth of the emitted light wavelength.

13. A method of interrogating an addressable array unit having a substrate with a back surface, and an array with a plurality of different chemical features on a front surface, the method comprising::

- (a) illuminating the features while the array is dry, with an interrogating light which is directed through the substrate from the back surface and onto the chemical features on the front surface; and
- (b) detecting light emitted from respective features in response to the interrogating light, which detected light has passed from the front surface, through the substrate and out the back surface;

wherein the light is emitted from locations of the features which are spaced from the front surface a distance such that the average detected signal from the dry array is at least 10% greater than would be detected under the same conditions except with the interrogating light and detected emitted light not passing through the substrate.

14. A method according to claim 13 wherein the average detected signal from the array is at least 40% greater.

15. A method according to claim 13 wherein the average detected signal from the array is at least 80% greater.

16. A package comprising:
an addressable array unit having a transparent substrate with a back surface, and an array with a plurality of different chemical features on a front surface, the chemical features having a thickness of less than 100 nm; and

instructions to:

- (i) interrogate the array with an interrogating light which is directed through the substrate from the back surface and onto the chemical features on the front surface; and
- (ii) detect light emitted from respective features in response to the interrogating light, which detected light has passed from the front surface, through the substrate and out the back surface.

17. A package according to claim 16 wherein the features have a thickness of less than 50 nm.

18. A package according to claim 16 wherein the features have a thickness of less than 10 nm.
19. A method according to claim 1 additionally comprising, prior to the illuminating and detecting:
exposing the array to a sample in a liquid; and
washing and drying the array.
20. A method for use with an interrogating an addressable array unit having a transparent substrate with a back surface, and an array with a plurality of different chemical features on a front surface, the method comprising:
(a) machine reading an identifier associated with the array unit;
(b) based on the read identifier, retrieving by a processor an instruction that the array should be interrogated and read through the substrate from the back surface.
21. A method according to claim 20 wherein the identifier is on the array substrate or a housing carrying the array substrate.
22. A method according to claim 20 wherein the instruction is retrieved from the read identifier.
23. A method according to claim 20 wherein the instruction is retrieved from a memory using data from the read identifier.
24. A method according to claim 20 additionally comprising checking that the array is oriented within an array reader such that the array can be interrogated and read by the reader through the substrate from the back surface.